

REMARKS

The Office Action mailed March 14, 2008, has been received and its contents carefully noted. Claims 2-5 and 8-17 were pending and claims 2-5 and 8-17 were rejected. By this Response, claims 5, 14 and 16-17 have been canceled; claims 2 and 15 have been amended and new independent claim 18 added. Consequently, claims 2-4, 8-13, 15 and 18 are now pending. Support for amended claims 2, 15 and new claim 18 may be found in the specification and the claims as originally filed. In particular, for example, the Examiner is respectfully requested to refer, for example, to paragraphs [0042] through [0067] per Moto U.S. Published Application No. 2004/0233946, wherein, per [0054], bonding wire influence L21 can be removed and the high frequency performance of the module can be enhanced, for example, per [0056] such that the critical frequency of the circuit 10 is over 10 GHz when the capacitance exceeds 50 pF. No statutory new matter has been added. Therefore, reconsideration and entry of the claims, as amended, are respectfully requested.

Rejections under 35 U.S.C. 103(a)

The Examiner previously indicated that claims 15 and 16 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, independent claims 2 and 15 are now rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida (6,301,278) in view of Crane, Jr. et al. (2003/0044128). As indicated above, claims 2 and 15 have been amended to particularly recite “a stack . . . , said stack forming a parallel-plate capacitor with capacitance,” and, for example, “said laser diode being driven by a driver signal provided by said cathode and being biased in said anode through said electrically conductive layer and a bonding wire with inductance, said bonding wire being connected with said electrically conductive layer” and “a driver for providing said drive signal to said cathode of said laser diode, said driver being mounted on said metallic block/stack” (depending on the claim) and “wherein said capacitance of said parallel-plate capacitor is at least 50 pF such that a critical frequency formed by said parallel-plate capacitor and said inductance of said bonding

wire exceeds 10 GHz.”

As disclosed, an optical module per paragraphs [0042] through [0067] and as depicted has improved high frequency operating characteristics and is operable at 10 Gbps and so at a critical frequency in excess of 10 GHz. To transmit such a high frequency signal, a laser diode may receive a driving signal in the cathode thereof and be biased in the anode. This bias is supplied through an interconnection formed on the heat sink. The heat sink formed as a stack of recited layers is attributed with a capacitance of at least 50 pF and so achieves a critical frequency in excess of 10 GHz, when considered with parasitic inductance of bonding wire. The critical frequency is achieved by this capacitance of the heat sink and the parasitic inductance of the bonding wire, which is formed as the interconnection to the heat sink. See, for example, FIG. 10A and 10B where the capacitance values being greater than 50pF shows critical frequencies in excess of 10 GHz.

Additionally, it is important to understand that the optical module of the several described embodiments corresponding to amended claims 2, 15 and new claim 18 are arranged to supply the driving signal to the laser diode immediately physically close to the laser diode. Amended claim 2 and new claim 18 arrange the driver on the metal block on which the heat sink is placed: “said driver being mounted on said metallic block/electrically conductive block” (amended claim 2/new claim 18).

See, for example, paragraph [0053], “the critical frequency of the present module 1 shifts to higher frequency because the inductance L21 is omitted.” And in paragraph [0054], “the influence of the inductor L21 can be removed and the high frequency performance of the module can be enhanced.”

Amended claim 15 arranges the driver on the recited “stack” (electrically conductive heat sink, an insulating layer . . . and an electrically conductive layer).

Such arrangement stabilizes the ground potential, the metal block being a member providing the most stable ground potential and enabling the length of the bonding wire from the driver to the cathode of the laser diode to be short. This shortening of the bonding wire changes the parasitic inductance and improves the quality of the driving signal in the high frequency (in

excess of 10 GHz) region.

The amended claims also tend to clarify that (1) the driving signal is supplied from the driver to the cathode of the laser diode, while, (2) the DC bias is supplied to the anode through the interconnecting pattern on the heat sink. Moreover, amended claims 2, 15 and new claim 18 also clarify a point that the critical frequency, formed from the capacitance of the heat sink and the parasitic inductance of the bonding wire connected with the interconnecting pattern on the heat sink, exceeds 10 GHz.

The Examiner takes the position that it is well known in the art to apply a capacitor of at least 50 pF “because could be used to accumulating and holding a small charge of electricity, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art,” (Office Action, Page 3).

However, the combination of elements recited in amended claims 2, 15 and new claim 18 go beyond mere selection of a value for a capacitance. Moreover, the purpose is not “accumulating and holding a small charge of electricity.” The independent claims 2, 15 and 18 must be read as a whole. The Examiner must consider the result of achieving a high critical frequency in excess of 10 GHz providing 10 Gbps data transmission and not just the ability of a capacitor to hold electricity. Uchida fails to discuss such high frequency operation or structure for achieving high critical frequency and Crane fails to make up for the deficiencies of Uchida. Consequently, the rejection of claims 2 and 15 should be withdrawn. The Examiner is referred to M.P.E.P. 707.07(f) ANSWERING ASSERTED ADVANTAGES. The Examiner is respectfully requested to answer the asserted advantage of improved high frequency/high data transmission performance (of 10Gbps).

Claim 13 depends from claim 15 and is allowable for the reasons that claim 15 is allowable and further for reciting “an electrically conductive and grounded block, said heat sink being mounted on said conductive block,” the feature, as indicated above, further assisting in achieving a higher than 10 GHz critical frequency.

None of the prior art references discuss or suggest the combination of elements recited in amended claims 2 and 15 and new claim 18. Uchida (Abstract) states, “the capacitance of the

submount and the inductance of the package will be in an electrically floating condition when the laser device is activated, and the device is adapted for high-frequency operations.” In particular, Uchida describes the prior art of FIG.’s 9, 10 and 11: a “submount serves as a capacitor (with capacitance C1) and its package contributes an inductance L1 when they are operated such that their equivalent diagram may look as shown in FIG. 12. It now goes without saying that such capacitance C1 and inductance L1 effectively *prevent a high-frequency operation of the device,*” (emphasis added). Uchida then goes on to describe “electrically floating condition” at col. 6, l. 55 to col. 7, l. 5 and col. 7, ll.’s 18-35. Uchida thus teaches away from Applicant’s claims. Moreover, it is not stated what “high-frequency” is achieved by a Uchida laser device.

Applicant respectfully submits that the claims, as amended, render moot the remaining rejections under 35 U.S.C. 103(a). Therefore, Applicant respectfully urges that all the rejections under 35 U.S.C. 103(a) should properly be withdrawn.

Request for Interview

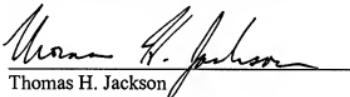
Applicant respectfully requests either a telephonic or an in-person interview should there be any remaining issues.

CONCLUSION

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

It is not believed that more than one extension of time is required or that any fees for additional claims are due, beyond those that may otherwise be provided for in accompanying documents. However, in the event that additional extensions of time or claims fees are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. §1.136(a), and any fees required for an extension or additional claims are hereby authorized to be charged to **Deposit Account No. 02-4300**, Attorney Docket No. **033035M143**.

Respectfully submitted,
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